

NON-PUBLIC?: N
ACCESSION #: 9304060250
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Arkansas Nuclear One, Unit One PAGE: 1 OF 03

DOCKET NUMBER: 05000313

TITLE: Reactor Trip Initiated By a Turbine Trip Which Was Caused
By The Occurrence Of Two Grounds On The 125 VDC System
EVENT DATE: 03/05/93 LER #: 93-001-00 REPORT DATE: 03/31/93

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Richard H. Scheide, Nuclear Safety TELEPHONE: (501) 964-5000
and Licensing Specialist

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On March 5, 1993, at approximately 1414, ANO-1 experienced a reactor trip which was initiated by the Anticipatory Reactor Trip System (ARTS) as a result of a main turbine trip. The plant post trip response was normal and no major equipment malfunctions were experienced. The reactor was returned to criticality at approximately 0726 on March 7, 1993 and the main turbine generator was tied to the grid at 0345 on March 8. The trip was determined to have been caused by the simultaneous occurrence of two grounds on the 125 VDC bus D-01. One of the grounds was on the Main Feedwater Pump control circuitry and the other was on the turbine trip circuitry. The two grounds created a short and resulted in actuation of the turbine trip circuitry, causing a turbine trip which initiated a reactor trip. The turbine trip circuitry ground was caused by vibration induced fretting where the wiring entered the cabinet. No grommet was installed in the cabinet. The cause of the MFP circuit ground is

unknown. The grounds were repaired and grommets installed. Turbine trip circuit wiring subject to vibration in the HP turbine area was inspected for similar conditions.

END OF ABSTRACT

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A. Plant Status

At the time this event occurred, Arkansas Nuclear One, Unit 1 (ANO-1) was operating at approximately 100 percent power. Reactor Coolant System (RCS) AB! temperature was 579 degrees and RCS pressure was approximately 2155 psig.

B. Event Description

On March 5, 1993, at approximately 1414, ANO-1 experienced a reactor trip which was initiated by the Anticipatory Reactor Trip System (ARTS) JC! as a result of a main turbine trip.

The ARTS provides for a reactor trip on a turbine trip or a loss of both main feedwater pumps (MFPs). These anticipatory trips limit the heat input to the system after a loss of secondary heat sink, thereby reducing the amount of heat that must be removed after a trip. Each of the four Reactor Protection System (RPS) JC! channels receives input based on the status of the main turbine and both MFPs. The information is supplied by pressure switches which monitor the hydraulic control oil pressure for the main turbine and the MFP turbines. The main turbine or both MFPs must trip to initiate an ARTS trip.

The plant post trip response was normal and no major equipment malfunctions were experienced. The reactor was returned to criticality at approximately 0726 on March 7, 1993 and the main turbine generator was tied to the grid at 0345 on March 8.

C. Root Cause

Prior to the reactor trip, work was being conducted to identify the source of frequent intermittent ground fault alarms on 125VDC bus D-01. Because of the intermittent nature of the ground, it had not been identified at the time of the trip. During the course of the investigation into the cause of the turbine trip which initiated the reactor trip, a positive ground was identified on the "B" MFP control circuitry. It was believed that the most probable cause of

the trip was an intermittent ground concurrent with a ground in the turbine trip circuitry. Initially no ground could be found in the turbine trip circuitry. After extensive troubleshooting efforts and elimination of the MFP circuit ground, reactor startup was commenced. On March 7, 1993, while conducting turbine trip testing, an intermittent ground occurred on D-01. Subsequently, this ground was located in the High Pressure (HP) turbine enclosure. The wires connected to the pressure switch which monitors turbine autostop oil pressure for indication of a turbine trip for the ARTS were found to have small spots where the insulation was worn through. This insulation damage coupled with the mechanical vibration inherent in the HP turbine housing resulted in an intermittent ground which, in conjunction with the ground in the "B" MFP circuitry, resulted in actuation of the turbine lockout relay and emergency trip solenoid, and ultimately a turbine trip.

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The cause of the worn insulation was determined to be vibration induced fretting of the insulation where the wires exited the panel mounted pressure switch and entered the cabinet. No protective grommet was installed where the wires entered the cabinet. An inspection of the cabinet revealed that none of the cabinet penetrations were grommets. This condition was most likely the result of an installation deficiency during initial construction. The ground in the "B" MFP circuitry was caused by an abraded wire inside a conduit. The root cause of this ground is indeterminate.

D. Corrective Actions

The damaged wires on the pressure switch were replaced and the "B" MFP control circuitry was repaired.

All main turbine trip circuit wiring passing through panel walls in the HP turbine housing were visually inspected for wear or the absence of protective grommets. Two additional wires were replaced and grommets were installed.

The wiring applications at the main turbine front standard and the MFP control circuits will be evaluated for vulnerability to vibration damage and, if appropriate, an action plan will be developed by the end of the next refueling outage which is scheduled to begin in September, 1993.

E. Safety Significance

The ARTS initiated a reactor trip due to a main turbine trip, as designed. The plant response to the trip was as expected with no major complications, and normal post trip parameters were maintained. Therefore, there was no safety significance associated with this event.

F. Basis For Reportability

This event is reportable pursuant to 10CFR50.73(a)(2)(iv) since an automatic reactor trip was initiated by the RPS.

This event was also reported in accordance with 10CFR50.72 at 1507 on March 5, 1993.

G. Additional Information

There have been no previous similar events reported by ANO.

Energy Industry Identification System (EIIS) codes are identified in the text as (XX).

ATTACHMENT 1 TO 9304060250 PAGE 1 OF 1

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March 31, 1993

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U. S. Nuclear Regulatory Commission
Document Control Desk
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Washington, D. C. 20555

SUBJECT: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Licensee Event Report 50-313/93-001-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(iv), enclosed is the subject report

concerning an automatic reactor trip.

Very truly yours,

James J. Fisicaro
Director, Licensing

JJF/RHS/mmg
Enclosure
cc: Regional Administrator
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